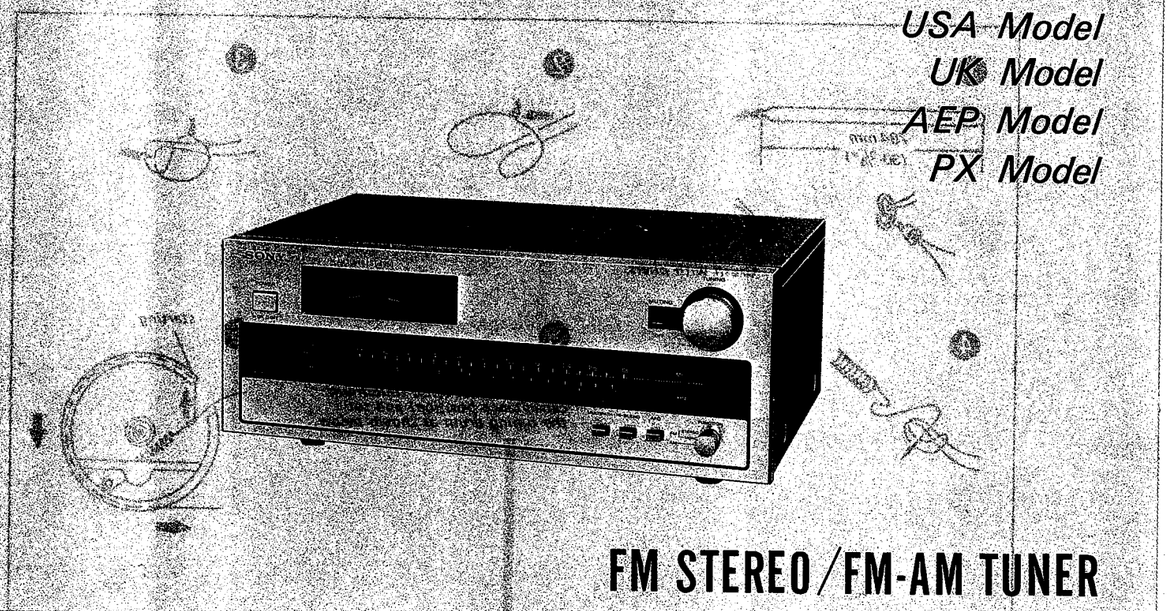
1758

ST-4950



USA Model
UK Model
AEP Model
PX Model

FM STEREO/FM-AM TUNER

SPECIFICATIONS

FM SECTION

Tuning range:	87.5 – 108 MHz
Intermediate frequency:	10.7 MHz
Antenna terminals:	300 Ω, balanced 75 Ω, unbalanced
Sensitivity:	1.9 μV (5.5 dB), IHF 1.5 μV (3.5 dB), S/N = 26 dB (1 kHz, 40 kHz deviation)
Image rejection:	70 dB
IF rejection:	100 dB
Spurious rejection:	100 dB
AM suppression:	56 dB
Capture ratio:	1.0 dB
Selectivity:	80 dB, IHF
S/N ratio:	70 dB
Frequency response:	20 – 15,000 Hz±1 dB
Harmonic distortion:	Mono: 0.15 % Stereo: 0.3 % at 400 Hz, 100 % (75 kHz deviation) modulation
Stereo separation:	Greater than 40 dB at 400 Hz and 1 kHz
19 kHz, 38 kHz suppression:	60 dB
SCA suppression:	60 dB (USA Model)
Muting level:	Less than 5 μV

A-M SECTION

Tuning range:	530 – 1,605 kHz
Intermediate frequency:	455 kHz (USA, PX Model) 468 kHz (UK, AEP Model)
Antenna:	Built-in antenna and external antenna terminal
Sensitivity:	250 μV/m (48 dB/m), built-in antenna 100 μV/m (40 dB/m), external antenna
Image rejection:	45 dB at 1,000 kHz
S/N ratio:	50 dB
Harmonic distortion:	0.5 %

GENERAL

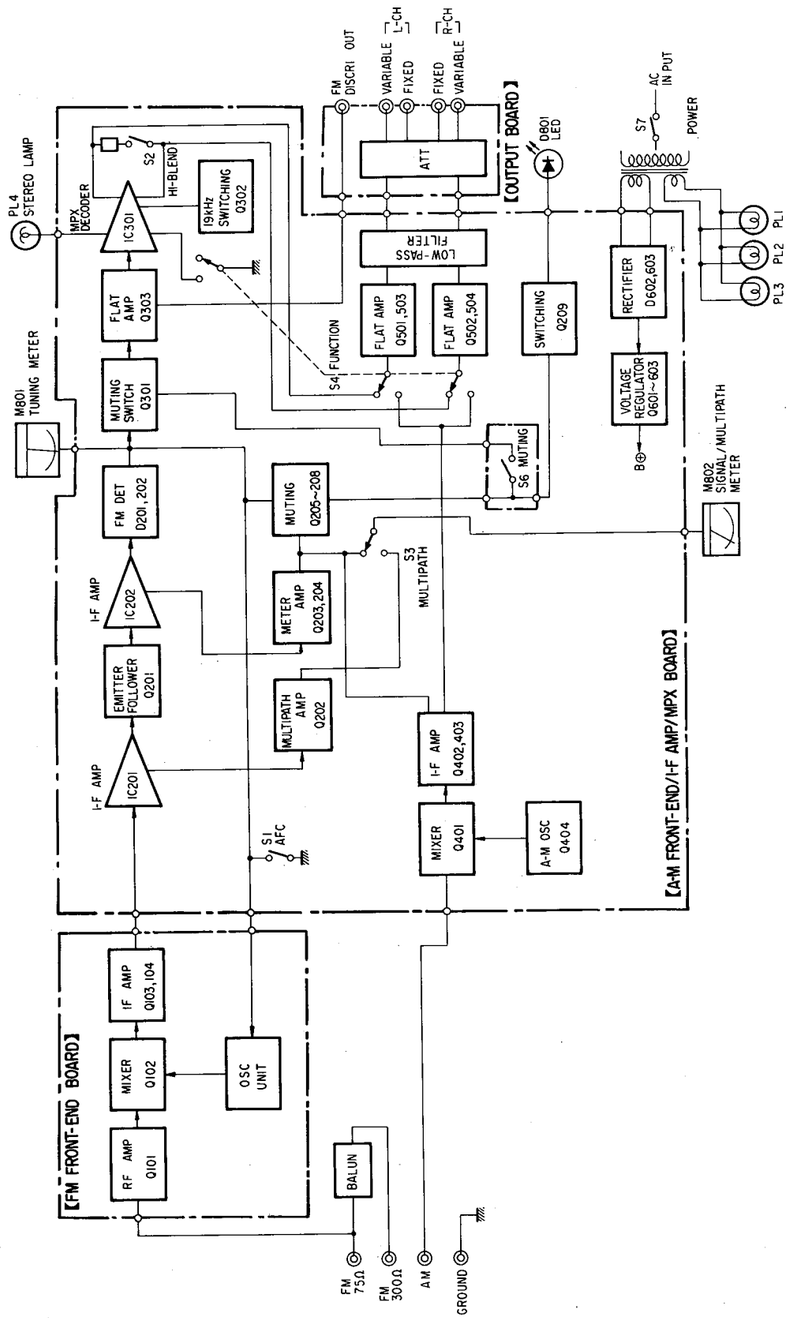
Outputs:	FIXED: 750 mV, 10 kΩ VARIABLE: 0~2 V, 3 kΩ FM DISCRI: 150 mV, 2.2 kΩ
Circuits:	Fm stereo, fm/a-m superheterodyne tuner
Power requirements:	120 V ac, 60 Hz (USA Model) 110, 127, 220 or 240 V ac, 50/60 Hz (UK, AEP Model) 100, 120, 220 or 240 V ac, 50/60 Hz (PX Model)
Power consumption:	22 W (USA Model) 25 W (UK, AEP, PX Model)
Dimensions:	USA Model: Approx. 430(w) x 168(h) x 331(d) mm 16⅞(w) x 6⅝(h) x 13(d) inches UK, AEP, PX Model: Approx. 460(w) x 168(h) x 331(d) mm 18⅛(w) x 6⅝(h) x 13(d) inches Including projecting parts and controls
Weight:	USA Model Approx. 7.7 kg. 17 lb (net) Approx. 10 kg. 22 lb 1 oz (with shipping carton) UK, AEP, PX Model Approx. 8.6 kg, 18 lb 15 oz (net) Approx. 10.9 kg, 24 lb (with shipping carton)

SONY®

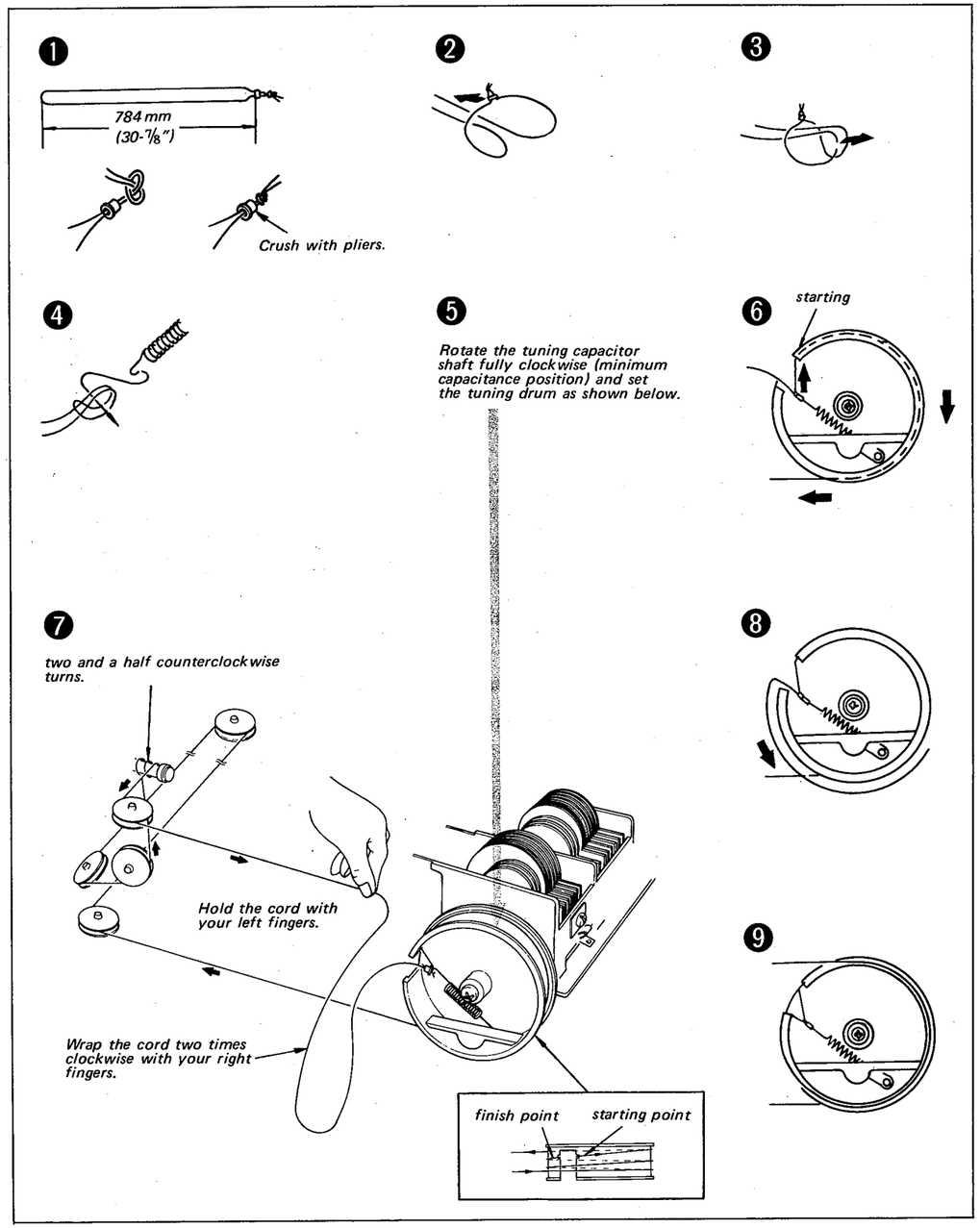
SERVICE MANUAL

MEMO

SECTION 1
BLOCK DIAGRAM



SECTION 2
DIAL CORD STRINGING



SECTION 3
ALIGNMENT AND ADJUSTMENTS

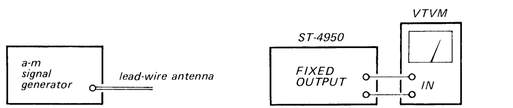
FM FREQUENCY COVERAGE AND TRACKING ALIGNMENT

Never attempt alignment of the fm front-end section for the fm frequency coverage and tracking alignment. If the fm frequency coverage alignment is required, replace the fm front-end board (FAF-030).

In the case of tracking alignment, ask your nearest SONY Service Station to send your set to the Factory Service Center.

AM FREQUENCY COVERAGE AND AM TRACKING ALIGNMENT

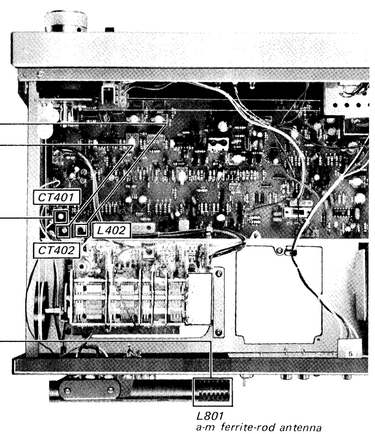
Test setup:



Adjust for maximum reading.

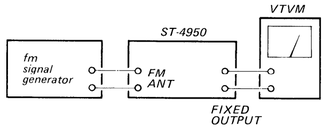
AM FREQUENCY COVERAGE
530 kHz (modulated)
1,605 kHz (modulated)

AM TRACKING
1,400 kHz (modulated)
600 kHz (modulated)



FM OUTPUT LEVEL ADJUSTMENT

Test setup:



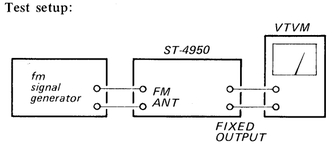
FM Signal Generator Setting:

Carrier frequency: 98 MHz
Modulation: 400 Hz, 75 kHz deviation (100%)
Output level: 60 dB (1,000 μV)

Adjust RT302(L-CH), RT303(R-CH) for 750 mV on the VTVM.

SIGNAL METER ADJUSTMENT

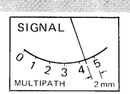
Test setup:



FM Signal Generator Setting:

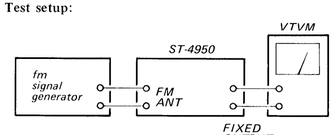
Carrier frequency: 98 MHz
Modulation: 400 Hz, 75 kHz deviation (100%)
Output level: 60 dB (1,000 μV)

Tune the tuner to 98 MHz and adjust RT202 for specified pointer position (See figure below.) on the SIGNAL meter.



FM IF ALIGNMENT

Test setup:



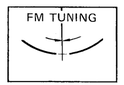
FM Signal Generator Setting:

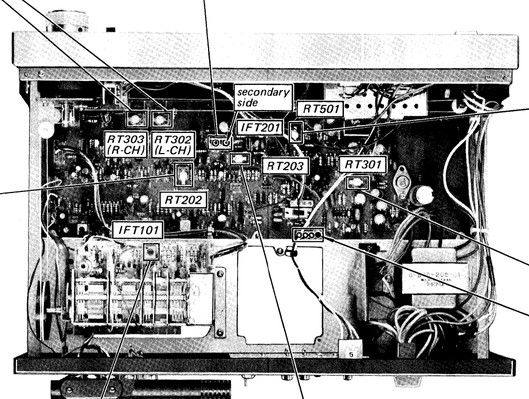
Carrier frequency: 98 MHz
Modulation: 400 Hz, 75 kHz deviation (100%)
Output level: 60 dB (1,000 μV)

Tune the tuner to 98 MHz and adjust IFT101 for maximum reading on the VTVM.

DISCRIMINATOR ALIGNMENT

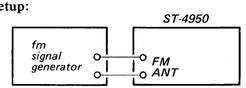
1. Detune the tuner.
2. Adjust the secondary side core of IFT201 for zero center on the TUNING meter.





MUTING NULL ADJUSTMENT

Test setup:



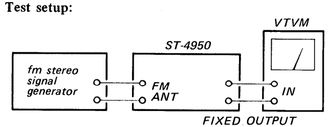
FM Signal Generator Setting:

Carrier frequency: 98 MHz
Modulation: 400 Hz, 75 kHz deviation (100%)
Output level: 60 dB (1,000 μV)

Adjust RT203 so that the muting circuit begins to operate at the symmetrical deflection point of TUNING meter when detuning the tuner to higher or lower than 98 MHz.
(Do not touch at RT201)

FM STEREO SEPARATION ADJUSTMENT

Test setup:



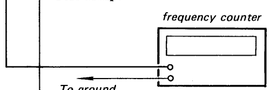
FM Stereo Signal Generator Setting:

Carrier frequency ..... 98 MHz
Mode ..... Stereo
Audio (400 Hz) Mod ..... 67.5 kHz (90%)
Pilot (19 kHz) Mod ..... 7.5 kHz (10%)

1. Tune the tuner to 98 MHz.
2. Adjust RT501 for maximum output on the VTVM at the left channel, and record the output level.
3. Record the residual signal level when the stereo signal generator input selector is switched to the right channel.
   Note: The output level to residual-level ratio represents the separation.
4. Measure the separation at the right channel.
5. Readjust RT501 for minimum difference between left and right channel separation.

MPX ADJUSTMENT

Test setup:

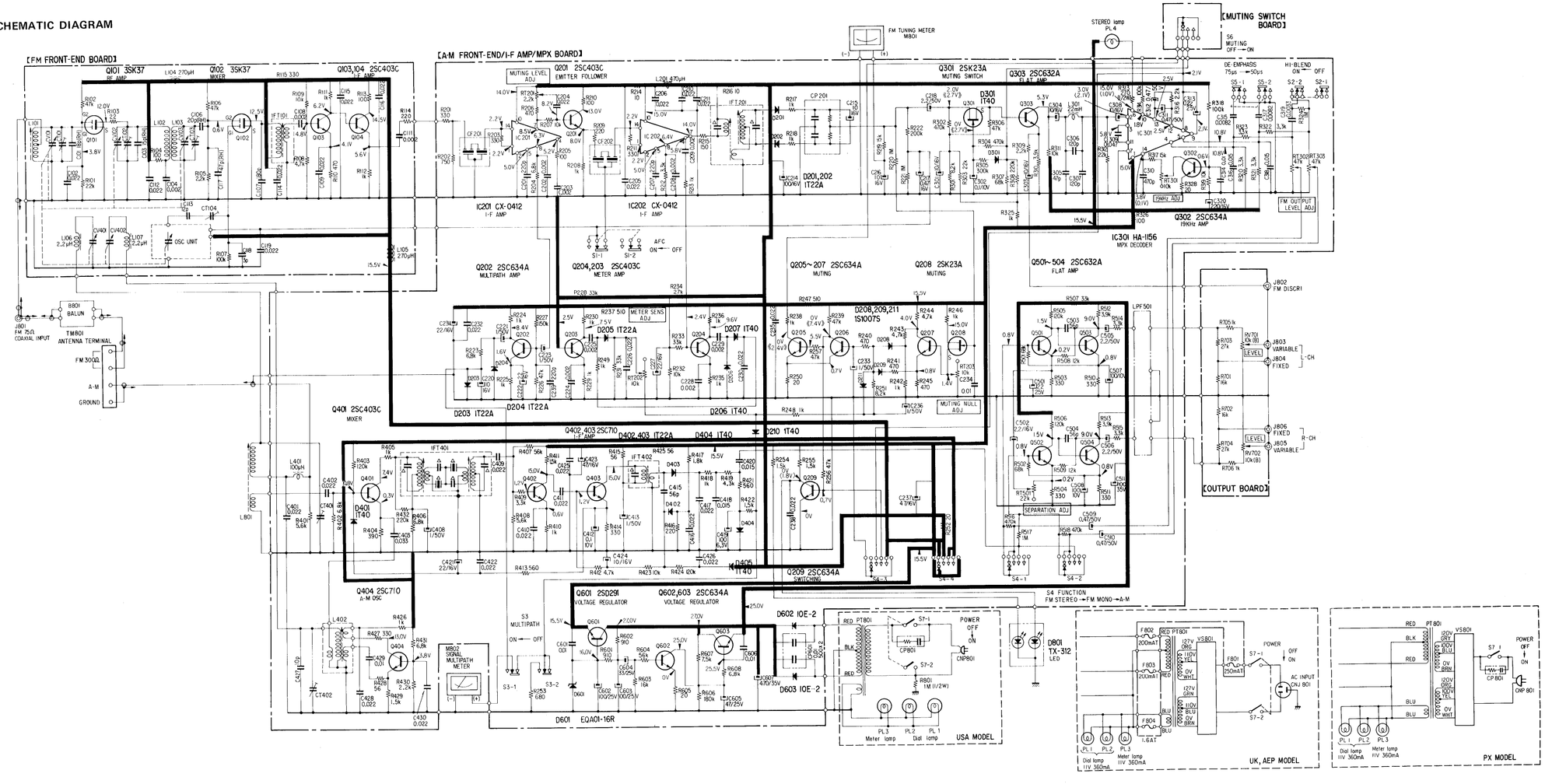


Adjust RT301 for 19 kHz±100 Hz on the counter with no input signal.

ST-4950 ST-4950

SECTION 4
DIAGRAMS

4-1. SCHEMATIC DIAGRAM

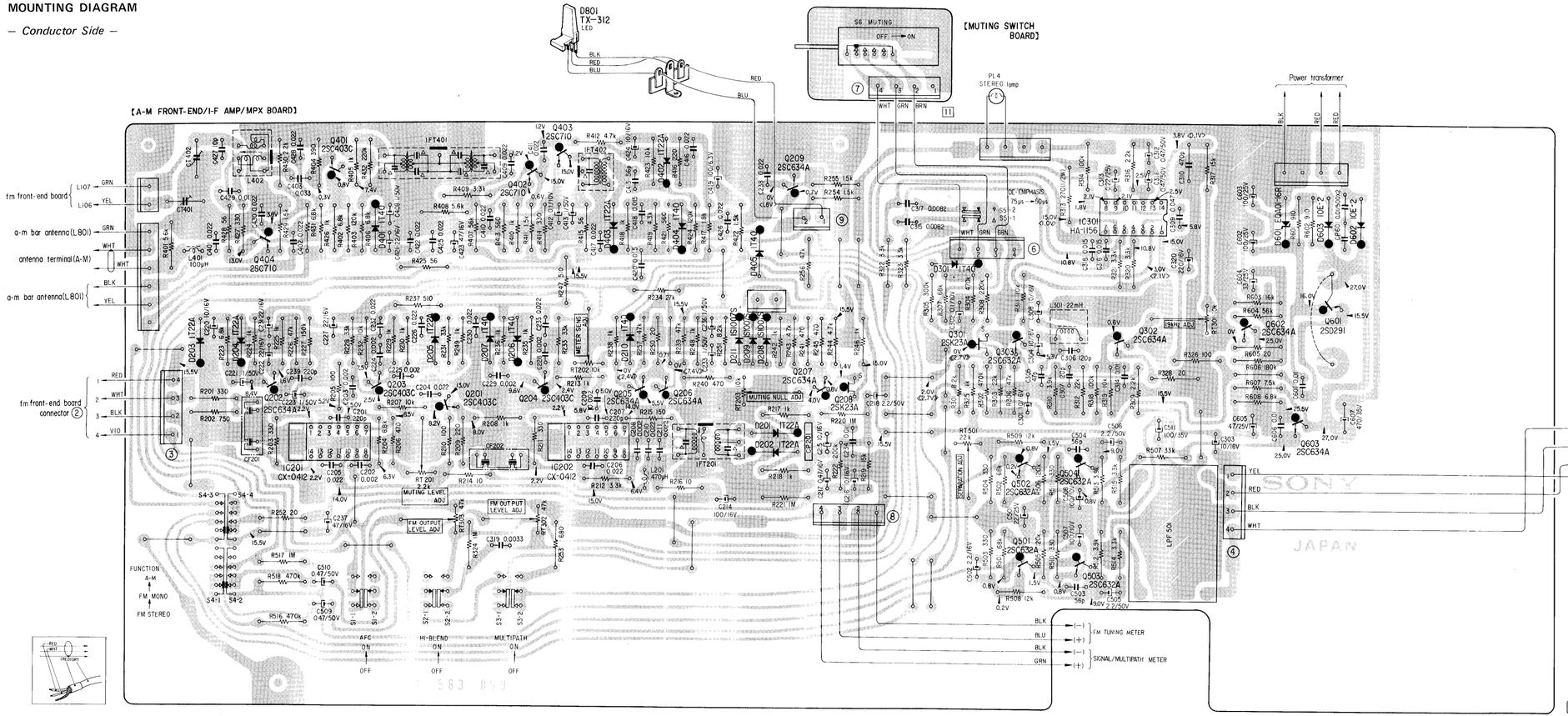


Ref. No.	Description	Position
S1	AFC SW	OFF
S2	HI-BLEND SW	OFF
S3	MULTIPATH SW	OFF
S4	FUNCTION SW (FM STEREO-FM MONO-AM)	FM STEREO
S5	DE-EMPHASIS SW (50 μs – 75 μs)	75 μs
S6	MUTING SW	OFF
S7	POWER SW	OFF

Note:
All resistance values are in ohms. k = 1,000 M = 1,000 k
All capacitance values are in μF except as indicated with p, which means μμF.
All voltages are dc measured with a VOM which has an input impedance of 20 k ohms/volt. No signal in.
Voltage variations may be noted because of normal production tolerances.
< > : Stereo operation
≪ ≫ : Muting switch "ON".
Capacitors marked △ are built in transformers.

4-2. MOUNTING DIAGRAM

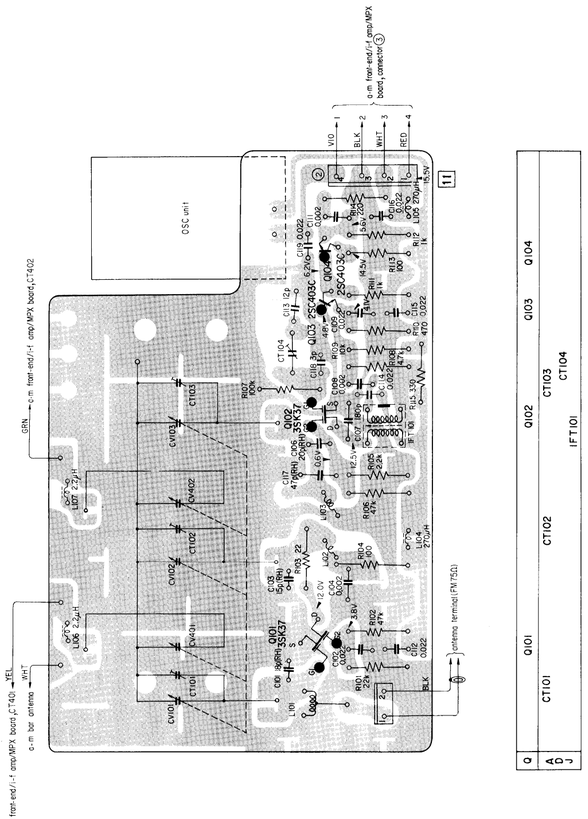
– Conductor Side –



| | | |

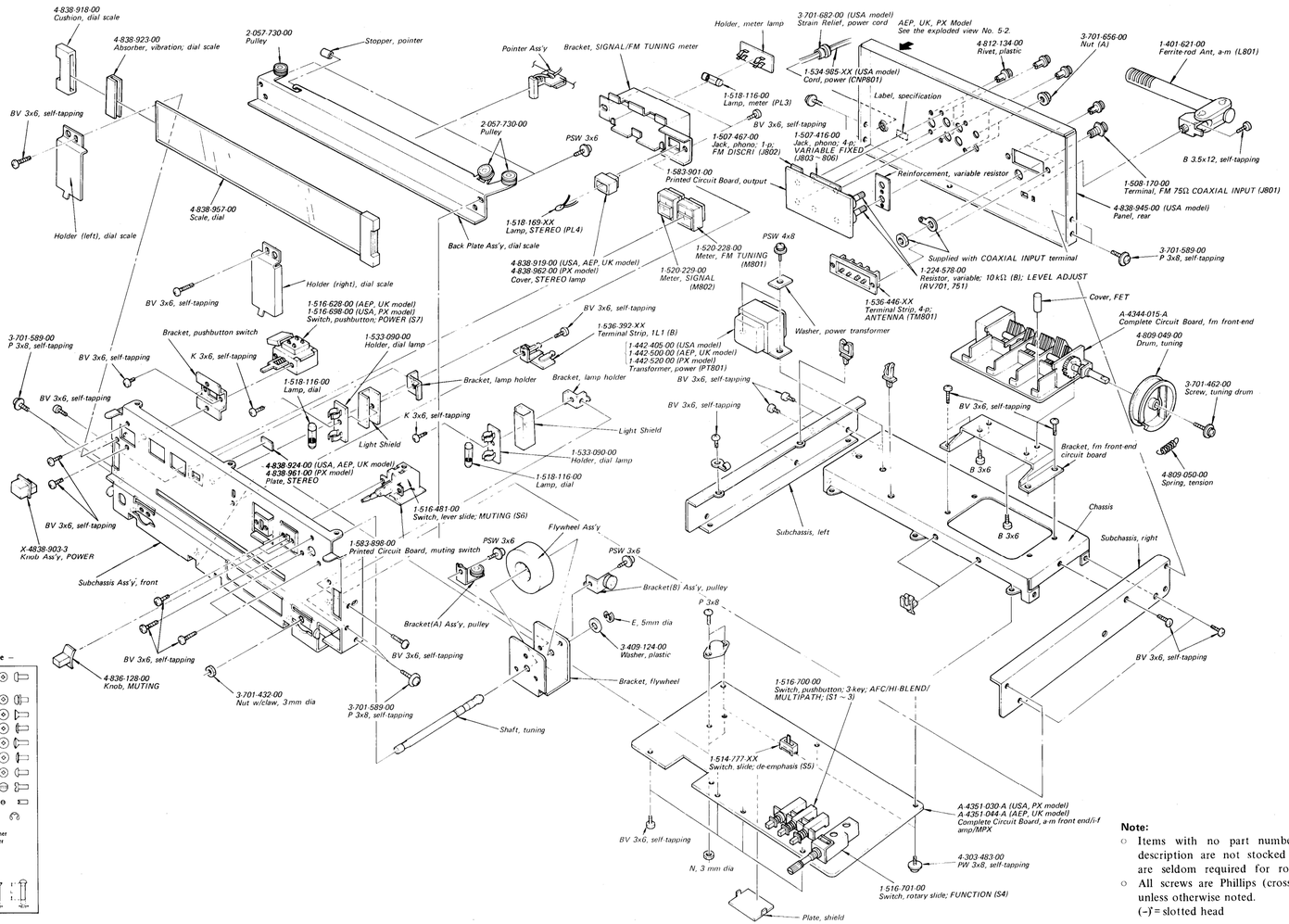
4-3. MOUNTING DIAGRAM – FM FRONT-END BOARD –

– Conductor Side –



SECTION 5
EXPLODED VIEWS

5-1.


4-838-918-00 Cushion, dial scale
4-838-923-00 Absorber, vibration; dial scale
2-057-730-00 Pulley
Stopper, pointer
Pointer Ass'y
Bracket, SIGNAL/FM TUNING meter
Holder, meter lamp
3-701-682-00 (USA model) Strain Relief, power cord
AEP, UK, PX Model See the exploded view No. 5-2.
4-812-134-00 Rivet, plastic
3-701-656-00 Nut (A)
1-401-621-00 Ferrite-rod Ant, a-m (L801)
1-534-985-XX (USA model) Cord, power (CNP801)
Label, specification
1-518-116-00 Lamp, meter (PL3)
BV 3x6, self-tapping
1-507-467-00 Jack, phono; 1-p; FM DISCRI (J802)
1-507-416-00 Jack, phono; 4-p; VARIABLE FIXED (J803 ~ 806)
B 3.5x12, self-tapping
PSW 3x6
1-583-901-00 Printed Circuit Board, output
Reinforcement, variable resistor
1-508-170-00 Terminal, FM 75Ω COAXIAL INPUT (J801)
4-838-945-00 (USA model) Panel, rear
Holder (left), dial scale
4-838-957-00 Scale, dial
1-518-169-XX Lamp, STEREO (PL4)
Back Plate Ass'y, dial scale
4-838-919-00 (USA, AEP, UK model)
4-838-962-00 (PX model) Cover, STEREO lamp
1-520-228-00 Meter, FM TUNING (M801)
1-520-229-00 Meter, SIGNAL (M802)
PSW 4x8
Supplied with COAXIAL INPUT terminal
1-224-578-00 Resistor, variable; 10 kΩ (B); LEVEL ADJUST (RV701, 751)
3-701-589-00 P 3x8, self-tapping
Holder (right), dial scale
1-516-628-00 (AEP, UK model)
1-516-698-00 (USA, PX model) Switch, pushbutton; POWER (S7)
1-536-446-XX Terminal Strip, 4-p; ANTENNA (TM801)
Cover, FET
A-4344-015-A Complete Circuit Board, fm front-end
4-809-049-00 Drum, tuning
3-701-462-00 Screw, tuning drum
Bracket, pushbutton switch
K 3x6, self-tapping
1-523-090-00 Holder, dial lamp
1-536-392-XX Terminal Strip, 1L1 (B)
1-442-405-00 (USA model)
1-442-500-00 (AEP, UK model)
1-442-520-00 (PX model) Transformer, power (PT801)
Washer, power transformer
Bracket, lamp holder
1-518-116-00 Lamp, dial
Light Shield
1-533-090-00 Holder, dial lamp
4-838-924-00 (USA, AEP, UK model)
4-838-961-00 (PX model) Plate, STEREO
1-516-481-00 Switch, lever slide; MUTING (S6)
Subchassis, left
Bracket, fm front-end circuit board
4-809-050-00 Spring, tension
B 3x6
Chassis
Subchassis, right
X-4838-903-3 Knob Ass'y, POWER
Subchassis Ass'y, front
1-583-898-00 Printed Circuit Board, muting switch
PSW 3x6
Flywheel Ass'y
Bracket(B) Ass'y, pulley
P 3x8
E, 5mm dia
3-409-124-00 Washer, plastic
Bracket(A) Ass'y, pulley
Bracket, flywheel
4-836-128-00 Knob, MUTING
3-701-432-00 Nut w/claw, 3mm dia
3-701-589-00 P 3x8, self-tapping
Shaft, tuning
1-516-700-00 Switch, pushbutton; 3-key; AFC/HI-BLEND/ MULTIPATH; (S1 ~ 3)
1-514-777-XX Switch, slide; de-emphasis (S5)
A-4251-020-A (USA, PX model)
A-4251-044-A (AEP, UK model) Complete Circuit Board, a-m front end/i-f amp/MPX
4-303-483-00 PW 3x8, self-tapping
N, 3 mm dia
1-516-701-00 Switch, rotary slide; FUNCTION (S4)
Plate, shield

– Hardware Nomenclature –

P	Pan Head Screw	
PS	Pan Head Screw with Spring Washer	
K	Flat Countersunk Head Screw	
B	Binding Head Screw	
RK	Oval Countersunk Head Screw	
T	Truss Head Screw	
R	Round Head Screw	
F	Flat Fillister Head Screw	
SC	Set Screw	
E	Retaining Ring (E Washer)	

W – Washer
SW – Spring Washer
LW – Lock Washer
N – Nut

– Example –

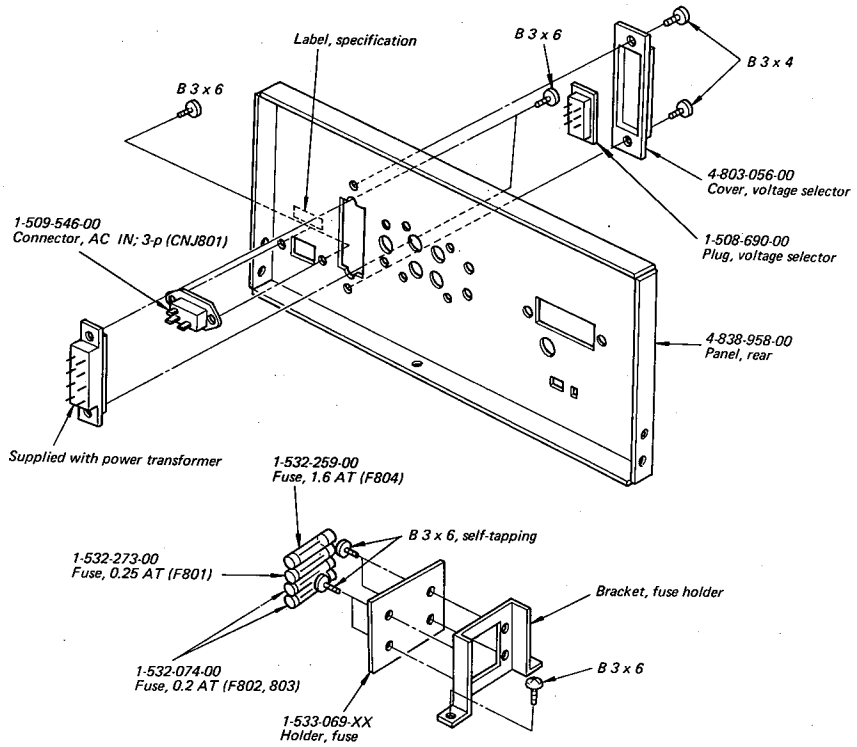
Type of Slot
P 3×10
Length in mm (L)
Diameter in mm (D)
Type of Head

Note:

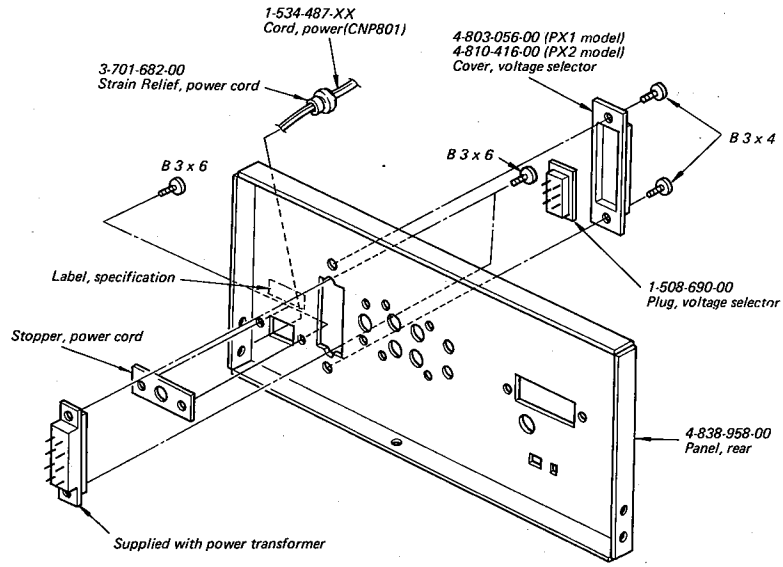
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (–)= slotted head

5-2.

(AEP, UK Model)



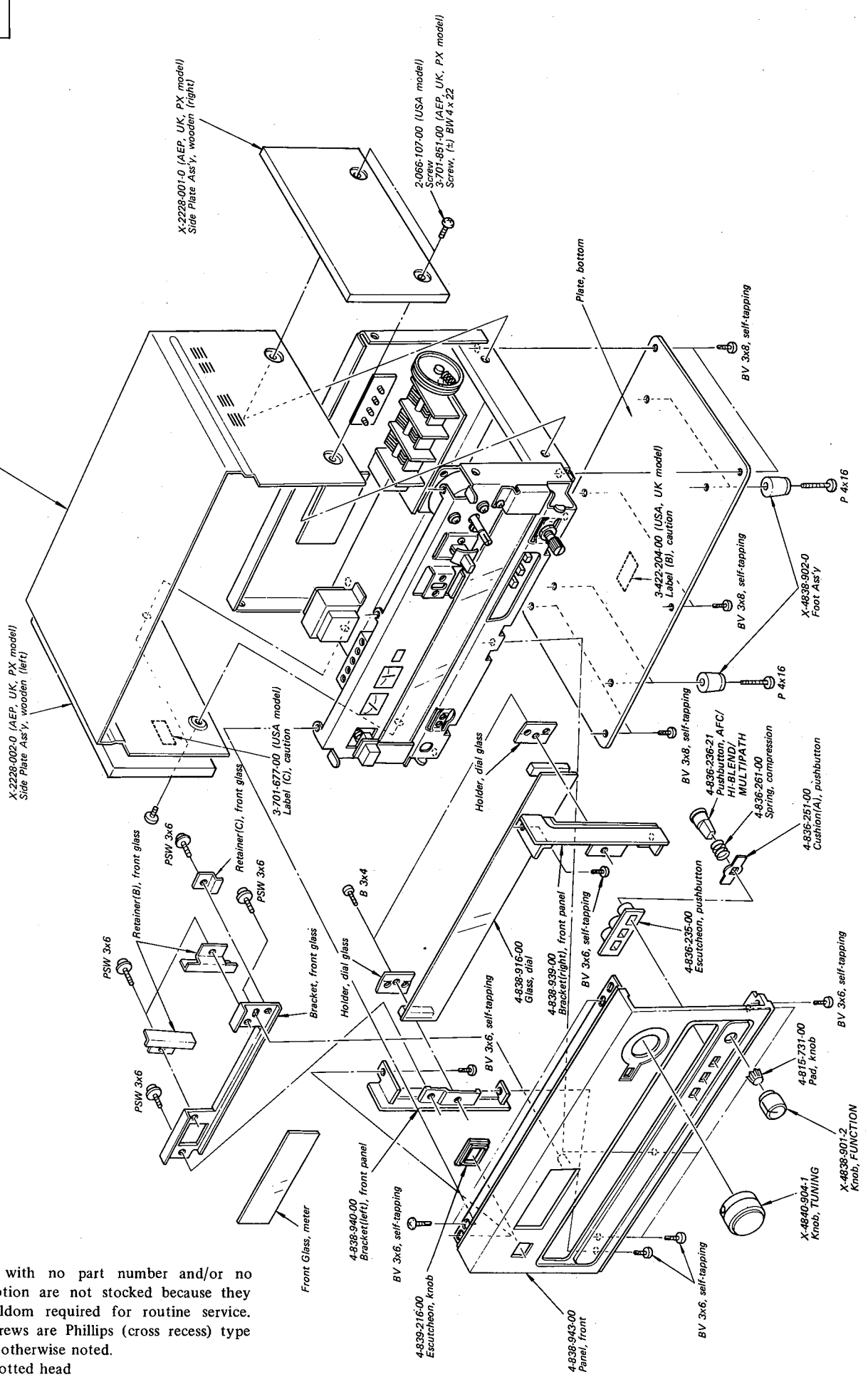
(PX Model)



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head

5-3.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (-) = slotted head

SECTION 6
ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description
	CIRCUIT BOARDS	
	A-4344-015-A	Fm Front-end, complete
	A-4351-030-A	Am Front-end/I-f Amp/MPX, complete (USA, PX model)
	A-4351-044-A	Am Front-end/I-f Amp/MPX, complete (AEP, UK model)
	1-583-898-00	Muting Switch
	1-583-901-00	Output
	SEMICONDUCTORS	
	Transistors	
Q101,102		3SK37 (FET)
Q103,104		2SC403C
Q201		2SC403C
Q202		2SC634A
Q203,204		2SC403C
Q205~207		2SC634A
Q208		2SK23A (FET)
Q209		2SC634A
Q301		2SK23A (FET)
Q302		2SC634A
Q303		2SC632A
Q401		2SC403C
Q402~404		2SC710
Q501~504		2SC632A
Q601		2SD291
Q602,603		2SC634A
	ICs	
IC201,202		CX-0412
IC301		HA-1156
	Diodes	
D201~205		1T22A
D206,207		1T40
D208,209		1S1007S
D210		1T40
D211		1S1007S
D301		1T40
D401		1T40
D402,403		1T22A
D404,405		1T40
D601		EQA01-16R
D602,603		10E-2
D801		TX-312
	TRANSFORMERS, COILS AND INDUCTORS	
B801	1-417-014-XX	Balun
IFT101	1-403-295-00	IFT, 10.7 MHz
IFT201	1-403-964-00	Transformer, discriminator
IFT401	1-403-963-00	IFT, a-m
IFT402	1-403-149-00	IFT, a-m
L101	1-401-601-00	Coil, fm antenna
L104,105	1-407-174-XX	Microinductor, 270 μH
L106,107	1-407-182-XX	Microinductor, 2.2 μH
L201	1-407-661-XX	Microinductor, 470 μH
L301	1-407-418-00	Shielded Inductor, 22 mH
L401	1-407-169-XX	Microinductor, 100 μH
L402	1-405-656-00	Coil, a-m osc
L801	1-401-621-00	Ferrite-rod Ant, a-m
PT801	1-442-405-00	Transformer, power (USA model)
	1-442-500-00	Transformer, power (AEP, UK model)
	1-442-520-00	Transformer, power (PX model)
	CAPACITORS	
	All capacitors are in μF and of ceramic unless otherwise noted. (p = μμ, elect = electrolytic) 50 or less working volts are omitted except for electrolytic type.	
C101	1-102-670-11	18 p
C102	1-101-924-11	0.022
C103	1-102-668-11	15 p
C104	1-102-257-11	0.0022

Ref. No.	Part No.		Description	
C106	1-102-671-11	20 p		
C107	1-102-848-11	180 p		
C108	1-101-919-11	0.0022		
C109	1-101-924-11	0.022		
C111	1-101-919-11	0.0022		
C112	1-101-924-11	0.022		
C113	1-102-510-11	12 p		
C114~116	1-101-924-11	0.022		
C117	1-102-887-11	47 p		
C118	1-102-876-11	3 p		
C119	1-101-924-11	0.022		
C201	1-102-110-11	220 p		
C202,203	1-101-919-11	0.0022		
C204~206	1-101-924-11	0.022		
C207	1-102-110-11	220 p		
C208,209	1-101-919-11	0.0022		
C210,211	1-101-924-11	0.022		
C214	1-121-415-11	100	16 V	elect
C215,216	1-121-651-11	10	16 V	elect
C217	1-127-204-11	0.47	16 V	solid aluminum
C218	1-123-050-11	2.2	50 V	elect
C220	1-121-651-11	10	16 V	elect
C221	1-121-391-11	1	50 V	elect
C222	1-121-479-11	22	16 V	elect
C223	1-121-391-11	1	50 V	elect
C224,225	1-101-919-11	0.0022		
C226	1-101-924-11	0.022		
C227	1-121-479-11	22	16 V	elect
C228,229	1-101-919-11	0.0022		
C230	1-101-924-11	0.022		
C231	1-121-479-11	22	16 V	elect
C232	1-101-924-11	0.022		
C233	1-121-391-11	1	50 V	elect
C234	1-105-673-12	0.01		mylar
C235	1-101-924-11	0.022		
C236	1-121-391-11	1	50 V	elect
C237	1-121-409-11	47	16 V	elect
C238	1-101-924-11	0.022		
C239	1-102-110-11	220 p		
C301	1-121-651-11	10	16 V	elect
C302	1-127-019-11	0.1	10 V	solid aluminum

Ref. No.	Part No.		Description	
C303,304	1-121-916-11	10	16 V	elect
C305	1-101-880-11	47 p		
C306,307	1-102-107-11	120 p		
C308	1-121-916-11	10	16 V	elect
C309	1-105-681-12	0.047		mylar
C310	1-103-717-11	470 p		styrol
C311,312	1-121-726-11	0.47	50 V	elect
C313	1-127-091-11	0.22	25 V	solid aluminum
C314	1-105-673-12	0.01		mylar
C315	1-105-512-12	0.0082		mylar
C316	1-105-515-12	0.015		mylar
C317	1-105-512-12	0.0082		mylar
C318	1-105-515-12	0.015		mylar
C319	1-105-667-12	0.0033		mylar
C320	1-121-421-11	220	16 V	elect
C401,402	1-101-924-11	0.022		
C403	1-105-679-12	0.033		mylar
C408	1-121-391-11	1	50 V	elect
C409~411	1-101-924-11	0.022		
C412	1-127-019-11	0.1	10 V	solid aluminum
C413	1-121-391-11	1	50 V	elect
C415	1-101-884-11	56 p		
C416,417	1-101-924-11	0.022		
C418	1-105-675-12	0.015		mylar
C419	1-121-413-11	100	6.3 V	elect
C420	1-105-675-12	0.015		mylar
C421	1-121-479-11	22	16 V	elect
C422	1-101-924-11	0.022		
C423	1-121-409-11	47	16 V	elect
C424	1-121-651-11	10	16 V	elect
C425,426	1-101-924-11	0.022		
C427	1-102-947-11	10 p		
C428	1-101-924-11	0.022		
C429	1-105-673-12	0.01		mylar
C430	1-101-924-11	0.022		
C501	1-121-480-11	22	25 V	elect
C502	1-127-205-11	2.2	16 V	solid aluminum
C503,504	1-101-884-11	56 p		
C505,506	1-123-050-11	2.2	50 V	elect
C507,508	1-121-414-11	100	10 V	elect
C509,510	1-121-911-11	0.47	50 V	elect

Ref. No.	Part No.			Description
C511	1-121-357-11	100	35 V	elect
C601	1-105-673-12	0.01		mylar
C602,603	1-121-416-11	100	25 V	elect
C604	1-121-404-11	33	25 V	elect
C605	1-121-410-11	47	25 V	elect
C606	1-105-673-12	0.01		mylar
C607	1-121-361-11	470	35 V	elect
CT104	1-141-138-00	Trimmer		
CT401,402	1-141-147-00	Trimmer		

RESISTORS

All resistors are in Ω. Regular-type ¼ W, carbon resistors are omitted. Check schematic diagram for the resistance values.
(k = 1000, M = 1000 k)

R313	1-202-559-11	270	½ W	composition
R801	1-202-719-11	1 M	½ W	composition (USA model only)
RT201	1-222-762-00	2.2 k, adjustable		
RT202,203 RT301	1-222-752-00	10 k, adjustable		
RT302,303	1-222-765-00	47 k, adjustable		
RT501	1-222-764-00	22 k, adjustable		
RV701,702	1-224-578-00	10 k (B), variable; LEVEL ADJUST		

SWITCHES

S1~3	1-516-700-00	Pushbutton, 3-key; AFC/HI-BLEND/MULTIPATH
S4	1-516-701-00	Rotary-slide, FUNCTION
S5	1-514-777-XX	Slide, de-emphasis
S6	1-516-481-00	Lever-slide, MUTING
S7	1-516-628-00	Pushbutton, POWER (AEP, UK model)
	1-516-698-00	Pushbutton, POWER (USA, PX model)

FILTERS

CF201,202	1-527-248-11	Fm I-f, ceramic; 10.70 MHz (red)
	1-527-248-21	Fm I-f, ceramic; 10.67 MHz (yellow)
	1-527-248-31	Fm I-f, ceramic; 10.73 (orange)
	1-527-248-41	Fm I-f, ceramic; 10.64 MHz (black)
	1-527-248-51	Fm I-f, ceramic; 10.76 MHz (black)
LPF501	1-231-219-00	Low-pass

FUSES
(AEP, UK Model)

F801	1-532-273-00	250 mAT
F802,803	1-532-074-00	200 mAT
F804	1-532-259-00	1.6 AT

MISCELLANEOUS

CNJ801	1-509-546-00	Connector, AC IN; 3-p (AEP, UK model)
CNP801	1-534-487-XX	Cord, power (PX model)
	1-534-985-XX	Cord, power (USA model)
CP201	1-231-278-00	Encapsulated Component
CP601	1-102-355-11	Capacitor, ceramic; 0.01 μF (500 V) (2 pieces)
CP801	1-231-057-00	Encapsulated Component (USA, PX model)
J801	1-508-170-00	Terminal, FM75 Ω COAXIAL INPUT
J802	1-507-467-00	Jack, phono; 1-p; FM DISCRI
J803~806	1-507-416-00	Jack, phono; 4-p; VARIABLE/FIXED
M801	1-520-228-00	Meter, FM TUNING
M802	1-520-229-00	Meter, SIGNAL/MULTIPATH
PL1~3	1-518-116-00	Lamp, dial/meter 11 V 360 mA
PL4	1-518-169-XX	Lamp, STEREO 4.5 V 40 mA
TM801	1-536-446-XX	Terminal Strip, 4-p; ANTENNA
VS801	1-508-690-00	Plug, voltage selector (AEP, UK, PX model)
	1-533-069-XX	Holder, fuse (AEP, UK model)
	1-533-090-00	Holder, dial lamp
	1-536-392-XX	Terminal Strip, 1L1 (B)

Part No.	*Description*
ACCESSORIES	
X-4490-002-0	Cloth Ass'y, polishing
1-501-083-21	Ribbon Antenna, fm
1-506-305-12	Plug, F (FP-33)
1-534-049-31	Cord, connection (RK-74)
1-534-819-11	Cord, power (UK model)
3-780-509-11	Manual, instruction (AEP, UK model)
3-780-509-21	Manual, instruction (USA, PX model)

Part No.	*Description*
SCREWS	
All screws are Phillips (cross recess) type unless otherwise noted.	
7-682-148-01	P 3 x 8
7-682-165-01	P 4 x 16
7-682-547-01	B 3 x 6
7-682-947-01	PSW 3 x 6
7-682-961-01	PSW 4 x 8
	B 3 x 4
7-685-245-01	K 3 x 6, self-tapping
7-685-645-31	BV 3 x 6, self-tapping
7-685-646-31	BV 3 x 8, self-tapping
7-685-656-01	B 3.5 x 12, self-tapping
MISCELLANEOUS	
7-624-109-01	Retaining Ring
7-684-023-01	N 3

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